Serial No.: 09/919,922
Docket No.: 66377-004

REMARKS

This Amendment is response to the Office Action of March 14, 2005, in which the Examiner made certain technical objections to the claims. In particular, the Examiner objected to claims 1-8 as allegedly failing to comply with the enablement requirement. According to the Examiner, there is a lack of enabling disclosure for the material model and the calculations of the various forces. The Examiner also objected to the form of the claims.

The applicant has amended the claims in order to address each of the Examiner's concerns.

With respect to the material model, applicant submits that the material models are background features can take many forms. The model referred in the Muskhelishvili article referred to in paragraph 0006 of Applicant's published specification explains the derivation of the model. It is believed that a recitation of the derivation of the model or indeed, the model itself is not necessary because such models are known. The invention deals with the model as affected by a force sufficient to rotate the particles.

There are numerous references in the specification to the applied load that, along with relevant text, would enable one skilled in the art to make and use the microstructural model. The applied load on the materials are referred to in paragraphs 0004, 0010. Paragraph 0022 specifies the forces arising from rotation and its associated strain.

Paragraph 0012 explicitly states that as the applied load increases, so does the angular rotation that will provide toughening in the microstructure. The applied load and the additional forces arising from the rotation of the microstructure entities themselves are specified in paragraphs 0019 and 0020. Finally paragraph 0022 specifies a compressive load in the direction of the angular rotation.

It is believed that the claims are fully supported because the microstructure entities comprising grains, particulates and particles exist initially in an equilibrium state prior to the application of an applied load. These particles each lie at a corresponding angle with respect to the applied load, so that in response to the load the entities rotate through a corresponding angle to thereby remain at equilibrium and to create induced stresses in surrounding matrix material. As further set forth in claim 2, these compressive and tensile forces add to existing stresses to produce attenuating stress and strain energy around cracks, pores and particles in the matrix.

As set forth in the specification there are many calculations in the prior art in which major or minor axis of the particles are aligned with the applied load and thus there is no rotation. In the present invention, the rotation is produced by the application of a load of axis, and this rotation is utilized to create stresses which attenuate a tendency of material to fail or crack under stress.

The Examiner's objection to terms "such that" or "in such a way", is respectively traversed. The terms simply recite cause and effect.

With respect to the Examiner's rejection of the allegedly omitted elements, applicant has recited the initial and final conditions before and after application of the force. Thus, the claim is believed to be complete.

In claim 4, the attenuation of the compressive stress is defined as a function having a series of terms which include r^{-n}, where r is the distance from the particle for the applied force and it is greater than or equal to 1. The attenuation of the compressive stress changes to a function including r^{-1}. This claim need not recite the entire function because the only term of interest is the distance and how the term changes under the conditions imposed by the invention.

The term "material" has been added to the objectionable claims.

The Examiner rejected the claims as allegedly anticipated by Niirhara cited by applicant.

The Examiner's rejection is respectively traversed for the reasons set forth below.

The article cited by the Examiner recites applications of SiC particles in enhancing mechanical properties by suppressing grain boundary sliding at elevated temperatures. In contrast, the elongated grains in the present invention rotate under an applied load in order to produce stresses that helps to prevent movement of a crack. The presence of elongated grains in the present invention does not toughen by crack bridging or crack deflection which are two other methods for toughening against fracture. The invention employs stresses induced by the rotation of elongated species to reduce cracks. This feature is not taught or

suggested in the cited paper. Nor are such stresses suggested as being beneficial.

It is submitted that the reference cited by the Examiner, namely Niirahara, US Patent No. 5,605,584 refers to toughening by dislocation dynamics along various crystal directions which establish more tortuous crack paths. The present invention induces stress from the rotation of elongated particles and grains to provide toughening. This is an entirely different mechanism than that disclosed in the reference.

It is requested that the Examiner correct the record in the Notice of References cited because the name of the applicant in Niirahara '584 is incorrect.

In view of the foregoing it respectfully requested that the Examiner reconsider his rejection of the claims and allowance which is earnestly solicited.

Respectfully submitted,

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